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Classroom Climate, Rigorous Instruction and Curriculum, and Students' Interactions in Urban Middle Schools

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Abstract

In this study we investigated the relation of rigorous instructional practices and teachers' efforts to create a respectful, collaborative learning environment to students' positive behavior toward one another and to the rate and quality of students' participation in classroom discussions. Full class period (i.e., 50-minute) observations of English language arts and mathematics lessons were conducted in 34 sixth- and seventh-grade classrooms in five high-poverty, urban, public middle schools ($N = 608$ students, 64 observations). Raters coded each lesson for the affective qualities of the classroom environment, the rigor of curricular tasks including guidelines for student work, and the quality of teacher-student verbal exchanges. We applied multiple regression techniques to explain predictive relations between classroom climate, instructional quality, and student behavior. Results indicated that the degree of respect that teachers showed students significantly predicted students' behavior toward one another. The presence of explicit rules in the classroom for respectful, prosocial behavior also significantly predicted the number of students who participated in discussions. Further, the quality of students' participation in class discussions—that is, the degree to which they built on other students' contributions and explained and supported their responses—was predicted by teachers pressing students to explain their thinking in discussions and by the rigor of the questions posed to students in the discussion.

The pressure on teachers, principals, and district administrators to improve instruction has never been greater. Research conducted over the past 25 years consistently has shown that many children in the United States have only basic or below-basic skills in reading and mathematics (National Center for Education Statistics, 2004). This is especially the case for chil-

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dren from low-income families, who consistently score well below their more privileged counterparts on standardized tests of achievement (National Center for Education Statistics, 2003). This gap widens as students move from elementary to secondary school. On the National Assessment of Educational Progress, the majority of eighth graders fail to reach the proficient level in mathematics, reading, and science, and scores for Latino and African American students significantly lag behind their white counterparts (Juvonen, Le, Kaganoff, Augustine, & Constant, 2004).

To redress the gap in student achievement and to improve learning generally, education reform policies have stressed the development of more rigorous content standards and assessments (presumably) aligned with those standards (Briars & Resnick, 2000). Accountability for student learning, codified in the No Child Left Behind Act of 2001, which threatens serious sanctions for schools that fail to meet standards for growth in students' achievement test scores, also has dominated education reform efforts. Relatively little attention of late has focused on improving affective features of the classroom environment—the quality of children's life in schools and classrooms apart from the rigor of instruction and curricula.

Although this is undeniably a critical issue, to focus on this dimension without considering students' social experiences in classrooms may miss an important piece of the puzzle for understanding why some learning environments are more effective than others. Research by Doyle and Carter (1984), for example, suggested that a teacher's ability to manage middle-school classroom interactions and routines plays an important role in the effective implementation of high-level academic tasks (see Doyle, 2006, for a review of studies in elementary and secondary school settings). Other research has linked the quality of children's social and emotional experience in classrooms to learning (Juvonen et al., 2004; Na-

tional Reading Panel, 2000), and there is even some neurobiological evidence with adults revealing the fundamental role of emotion in cognition (Immordino-Yang & Damasio, 2007). Battistich, Solomon, Watson, and Schaps (1997) found that a sense of school as a community was associated with increased liking for school, achievement motivation, intrinsic motivation for learning, and reading comprehension skill, especially among the most disadvantaged elementary school students. Brand, Felner, Shim, Seitsinger, and Dumas (2003) likewise found that dimensions of the middle-school climate, including students' commitment to academics, teacher support, positive peer interactions, and instructional innovation, were associated with higher academic performance.

The affective climate of the classroom also appears to have long-term implications for children's emotional health, which in turn plays a role in students' academic success (e.g., Cohen, 2001; Dake, Price, & Telljohann, 2003; Juvonen & Graham, 2001). Juvonen, Nishina, and Graham (2001) found that middle-school students who were bullied by classmates experienced greater depression, social anxiety, and loneliness, which in turn predicted lower grades and higher absenteeism. Their findings are of special concern in light of research showing that 14% of sixth graders are bullied at school (Young, 2002) and nearly a quarter (22%) of middle-school students have been threatened with a beating (Gottfredson et al., 2000). Roeser, Eccles, and Sameroff (1998) found as well that seventh graders who reported greater symptoms of emotional distress were more likely to have lower grades at the end of eighth grade.

The quality of the classroom climate and teacher-student relationships may be especially critical during students' transition to and through middle school. Students generally report a greater sense of anonymity with their teachers at this level of schooling and perceive them as less

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friendly and supportive in comparison to their teachers in elementary school (Davis, 2006; Feldlaufer, Midgley, & Eccles, 1988; Lynch & Cicchetti, 1997; Midgley, Feldlaufer, & Eccles, 1989). Students who perceive their middle-school teachers as supportive, however, tend to report enhanced motivation to learn (Davis, Davis, Smith, & Capa, 2003) and to receive higher grades (Davis, 2001; Davis et al., 2003).

In sum, research has indicated that the affective quality of the classroom plays an important role in student learning, suggesting that the ideal learning environment would balance a positive classroom climate with academic demand (Juvonen et al., 2004; Midgley & Edelin, 1998; Shann, 1999). Few studies, however, have explored how these dimensions of instructional practice interact with and contribute to students' learning and well-being. Midgley and Edelin (1998) noted that the extent to which "relationships are enhanced when children are truly learning, and learning is enhanced when children are in a caring environment" (p. 200) is an area that merits investigation.

In the study reported in this article, we investigated the links between these features of the classroom learning environment and students' interactions in urban middle-school classrooms. This study focuses on the relation of specific teaching behaviors associated with academically rigorous instruction and teachers' efforts to create a positive learning environment to students' behavior toward peers and to the rate and quality of students' participation in class discussions. Looking at specific teaching behaviors (e.g., follow-up questions to students) in relation to certain student behaviors (e.g., behavior toward peers, use of evidence to support a point made in a discussion, etc.) is critical to developing interventions and policy recommendations for professional development and preservice teacher training that can improve the classroom environment for adolescent students.

In the following sections we describe

the literature that formed the basis for how a positive classroom climate and academically rigorous instruction was defined for the purpose of this study.

Classroom Climate

The quality of the classroom climate—that is, the degree to which students feel connected and supported—has been defined in many ways (Brand et al., 2003; Trickett & Moos, 1973; Trickett & Quinlan, 1979). For example, in their study of middle schools, Brand et al. (2003) defined this construct in terms of teacher support, consistency and clarity of rules and expectations, student commitment and achievement orientation, negative peer interactions, positive peer interactions, disciplinary harshness, student input in decision making, instructional innovation and relevance, support for cultural pluralism, and safety problems. Classroom climate also has been defined in terms of students' feeling of safety and experience of school as a welcoming and supportive place, and opportunity to cooperate with peers (Brand et al., 2003; Epstein, 1985; Gottfredson & Gottfredson, 1985).

In our study, we defined a positive classroom climate as one that promotes respectful, caring relationships, cooperation, and emotional safety (i.e., an environment where individuals express themselves and are not subjected to taunting or slighting remarks). To this end, we focused on the presence of clear expectations for students that emphasized prosocial, respectful behavior (Jackson & Davis, 2000). Drawing on research on classroom climate and the prevention of school bullying with young children and adolescents, we also examined the degree of care and respect teachers showed students and students showed each other (Battistich et al., 1997; Fopiano & Haynes, 2001; Kusche & Greenberg, 2001; Shann, 1999). For example, Battistich et al. (1997) noted that teacher behaviors, such as providing support and encouragement to students, explicitly discussing or emphasizing

ing prosocial values, and promoting help and cooperation among students, were associated with a positive classroom climate and, in turn, with stronger motivation to learn in elementary school. In contrast, behaviors such as failing to explain or enforce classroom rules for conduct were associated with a negative classroom climate in middle school (see Doyle, 2006, for a review), and comparing students to one another, punishing, use of extrinsic rewards, and “overly controlling” behavior have been linked to poorer-quality learning environments in elementary school (Battistich et al., 1997). In terms of the degree of respect and caring that students show each other, Shann (1999) found that, among students between 12 and 14 years old, behaviors such as using offensive language (i.e., swearing), insulting peers, and disturbing class were indicators that students did not show respect toward each other and consequently were associated with a negative classroom climate. Conversely, behaviors such as students complimenting their peers for good work were associated with caring and respectful relations among peers and with a positive classroom climate in middle school. Moreover, research conducted in both elementary (Epstein, 1985; Fopiano & Haynes, 2001) and middle schools (Shann, 1999) has revealed that opportunities for students to engage in collaborative work with peers are associated with a positive classroom climate of caring and respect.

Rigorous Instruction

In mathematics and reading comprehension, numerous studies in both elementary and secondary schools have demonstrated that rigorous instruction provides students with an opportunity to participate in classroom discussions that involve academically substantive content and that are characterized by students and teachers building on, and extending, each others’ contributions and providing evidence for their assertions (e.g., Cobb, Boufi, McClain, & Whitenack,

1997; Goldenberg, 1992/1993; Hiebert et al., 1997; Michaels & O’Connor, 2002; Resnick & Hall, 2001; Silver & Stein, 1996; Tharp & Gallimore, 1988).

In mathematics, rigorous instruction also is characterized by students engaging with high-level mathematical tasks that support the development of connections between mathematical ideas and different representations of these ideas throughout a lesson (i.e., during task implementation) (Henningsen & Stein, 1997; National Council of Teachers of Mathematics, 1989, 1991, 2000; Stein & Lane, 1996; Stein, Smith, Henningsen, & Silver, 2000). An example of a rigorous mathematical task is the “cookie thief” problem in which a boy sneaks into the kitchen to eat half of the cookies on a plate, and on each subsequent night he continues to eat half of the remaining cookies. Students are asked to determine at what point the thief would finish all the cookies and to justify their answer by providing an equation and at least one additional representation of their thinking (e.g., make a graph or table, describe how they solved the problem). This task requires students to use their knowledge of algebra (including proving that the answer will never be zero), and the problem is open-ended enough that students can approach it using many strategies. Further, the task supports increased understanding of algebraic equations by requiring students to represent and explain their thinking in multiple ways.

In reading comprehension, rigorous instruction exposes students to texts that contain ideas that are complex enough to support meaningful writing topics and discussion and engages students in activities that require them to construct meaning beyond what is represented on the page (Beck, McKeown, Hamilton, & Kucan, 1997; Snow, 2002). Teachers develop students’ analytical skills by modeling these processes and by providing students with the opportunity to answer higher-level questions during class discussions and in

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their written work (Goldenberg, 1992/1993; Snow, 2002; Tharp & Gallimore, 1988). An example of a rigorous task in reading comprehension is one based on Shakespeare's *Macbeth*. Students are asked to identify "Macbeth's tragic flaw," taking into consideration that "Macbeth is not a purely evil man, but a good man who has done horrible things. What is it about him that made him capable of such horrible deeds?" Students are then asked to go beyond this challenging character analysis to abstract the play's themes: "Is there a lesson to be learned by the events in the play?" Students are guided to use evidence from the text to support their answers. This task deepens students' ability to analyze literature and even to consider the broader themes and meaning of a literary work.

The quality of the expectations teachers hold for students also plays an important role in rigorous instruction. Implementing high-level tasks in ways that promote students' learning with understanding is often shaped by teachers' and students' beliefs about how content is best taught and learned (Romanagno, 1994). Research conducted across the levels of schooling has indicated that teachers' perceptions of the types of learning opportunities that are possible with a given group of students affect their expectations for students and the standards of products and processes for which students are held accountable (Black & Wiliam, 1998). Students in both the elementary and secondary grades are unlikely to voluntarily go beyond (or produce more than) the teacher's task requirements: rather, they often identify the minimum information and operations necessary to complete the task and to meet the teacher's criteria for completion (Doyle, 1983). Hence, how teachers define a task, the directions they give to students, and the criteria they communicate with regard to what "good" student work should look like play an important role in determining the rigor of students' academic work.

Based on the research described here,

we defined quality of classroom climate as the level of respect and regard teachers showed students in class discussions and activities, students' opportunity to engage in collaborative work, and the presence of classroom rules for respectful, prosocial behavior. We defined instructional quality as the rigor of class discussions and academic tasks and the expectations expressed to students for the quality of their work. The research questions that guided this investigation were: (1) What are the relative contributions of classroom climate and the quality of curriculum and instruction to the degree of respect that students exhibit toward one another in the classroom? And, (2) What are the relative contributions of classroom climate and the quality of curriculum and instruction to the rate and quality of students' participation in class discussions?

Method

Sample

We recruited 34 sixth- and seventh-grade teachers from five medium-sized middle schools in an urban district on the East Coast serving primarily minority students from low-income families. Of the 34 teachers, 21 taught English language arts (ELA) and 13 taught mathematics. The majority of teachers were female ($n = 25$) and white ($n = 27$). Four teachers were African American and three were Latino. The students ($N = 608$, 54% girls) in the classrooms we observed were ethnically diverse (46.4% Latino, 23.2% African American, 18.7% white, 10.1% Asian, and 1.1% Native American or other). The majority (81%) were eligible for free or reduced-price lunch.

Procedure

A member of the research team contacted the principals of each middle school in the district and then visited the schools that agreed to participate to discuss the

study with interested teachers. Teachers were told that this was a study of classroom practice and approaches to measuring practice. As part of that effort (that also included collecting classroom artifacts and student work), we asked teachers if we could observe typical lessons in which they held a text discussion (in English language arts) or engaged in a problem-solving activity and discussion of that activity (in mathematics). Teachers were told that what was observed in their classrooms would be confidential.

Observations took place over 2 weeks in March and were scheduled at times that were convenient for teachers. Teachers and their students were observed on 2 consecutive days for the same class period by the same rater (resulting in 38 reading comprehension and 26 mathematics lesson observations). Observers sat quietly in the back of the classroom and did not participate in the lesson discussions or activities. Because of scheduling conflicts, four of the reading comprehension teachers (out of the 21) were only observed once.

Members of the research team (including the first two authors) and two graduate students in mathematics education conducted the observations. Two members of the team were former middle-school teachers, and all had extensive experience observing in classrooms. All observers underwent an intensive rater-training program that included study of the rubrics, practice taking field notes, and practice scoring lesson tasks and videotapes of lessons from nonsample classrooms. Prior to the study observation, each possible rating pair also practiced observing in nonsample classrooms to ensure acceptable interrater agreement and to practice field-note writing.

Observers took detailed field notes during each lesson observation to obtain a record of teacher and student interactions that was as close to verbatim as possible (including specific utterances and nonverbal communication). Any documentation of the lesson activities (i.e., task directions

handed out to students, instructions for lesson tasks, lists of criteria for quality work that were given to students) from each observation was collected as well. Immediately following an observation, raters analyzed the field notes (in a location outside the classroom) to code rubrics, with attention to the types of questions posed to students in class discussions, the rigor of activities, student-to-student interactions, and the rules/expectations posted in classrooms. (These field notes were later transcribed.) Coding dilemmas were resolved in conversations between members of the research team later in the day that the observation was held. The dimensions used to analyze the observations are described in the following section.

Measures

This section describes the rubrics used to measure quality of the classroom climate, rigor of curriculum and instruction, and students' interactions. We used parallel measures to assess rigor of instruction in both content areas, though some rubrics were tailored to reflect best practices in each discipline. Classroom climate rubrics used a four-point scale (1 = poor, 4 = excellent). The instructional quality rubrics used a five-point scale (0 = poor, 4 = exemplary), with the exception of quality of curricular materials in English language arts, which was assessed on a four-point scale (0 = poor, 3 = exemplary):

Classroom Climate

Respect a teacher exhibits toward students:

High score: Teacher listens attentively to students and provides them with ample "wait time" to develop their ideas and responses (e.g., teachers look at students and nod as students are talking, accurately record students' ideas on chart paper or on the board).

Middle score: Teacher provides little time for students to respond to or develop their ideas and might occasionally interrupt students.

Low score: Teacher does not listen to students during discussion (e.g., carries

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on other conversations while students are talking) or humiliates and insults students—even in a joking fashion. *Opportunity for students to engage in collaborative work:*

High score: Students work collaboratively with their peers on a project that involves substantial interaction and cooperation (e.g., work in small groups, students assume roles such as facilitator and note-taker to respond and chart their thoughts in response to a question about a text).

Middle score: Students work on a project that requires only minimal interaction and cooperation.

Low score: Students work individually only.

Classroom rules for positive, prosocial, respectful behavior:

High score: Rules emphasize treating others with respect and kindness.

Middle score: Rules make no mention of respectful and kind interactions between students (e.g., rules remind students to obey school rules, arrive to class on time, etc.).

Low score: No classroom rules are posted.

Rigor of Instruction

Teacher presses for accurate knowledge and rigorous thinking:

High score: Teacher consistently asks students academically relevant questions that prompt them to provide evidence for their contributions or explain their reasoning (e.g., “Hmmm . . . can you show us exactly what he said in the book that makes you think that?”).

Middle score: Teacher asks students to provide evidence for their contributions or explain their reasoning, but questions focus on superficial or trivial content.

Low score: Teacher does not ask students to provide evidence for their contributions or explain their reasoning.

Teacher links student contributions to each other:

High score: Teacher consistently connects students’ contributions to each other and shows how ideas/positions presented during the discussion relate to each other by revoicing or summarizing students’ ideas (e.g., “So Isabella’s solution is actually a lot like the solution that Juan is putting on the table, only she

used multiplication and he did it by adding.”).

Middle score: Teacher connects students’ contributions to each other but does not show how students’ ideas/positions relate to each other.

Low score: Teacher does not make any effort to link or revoice students’ contributions.

Rigor of the Discussion

English language arts:

High score: The discussion assists students in interpreting or analyzing the underlying meanings or literary characteristics of a text (e.g., students discuss present-day examples of what it means to wear a “scarlet letter”).

Middle score: The discussion engages students in summarizing the text.

Low score: The discussion involves students in recalling fragmented, isolated facts from a text only.

Mathematics:

High score: The discussion engages students in explaining why their strategy, idea, or procedure is valid and engages them in making connections to the underlying mathematical ideas (e.g., students collect data on their classmates’ opinions about school policies, represent their findings by selecting at least two graphics, then explain how each representation lends itself to interpretation).

Middle score: The discussion engages students in showing and describing their written work for solving the task but does not prompt them to explain why their strategy, idea, or procedure worked and was appropriate for the problem.

Low score: The discussion engages students in providing answers that are one word only, or are nonmathematical.

Rigor of the Curricula/Task Materials

English language arts:

High score: The text contains a nuanced plot and/or complex theme and literary language (low-frequency vocabulary as well as complex and varied sentence structures, such as that found in Nathaniel Hawthorne’s *The Scarlet Letter* or Lois Lowry’s *The Giver*).

Middle score: The text contains a moderately complex theme or familiar and predictable plot, and some literary language.

Low score: The text contains only a simple narrative or basic information and simple language.

Mathematics:

High score: The task offers the potential to build deep conceptual understanding in mathematics by engaging students in using complex, nonalgorithmic thinking to solve a problem or by applying mathematical concepts to determine which procedure is appropriate for solving a problem (as in the example of collecting, representing, and interpreting data in multiple ways, as illustrated above).

Middle score: The task engages students in one procedure, such that the task focuses on producing correct answers rather than on developing mathematical understanding.

Low score: The task only requires students to memorize or reproduce facts, rules, formulae, or definitions.

Rigor of Lesson Activity (Implementation of Curricula/Tasks)

English language arts:

High score: The lesson activity engages students in analyzing and interpreting a text and gives students the opportunity to develop and elaborate their ideas and engage with the larger significance of a text (e.g., make connections to ideas beyond the events in the story).

Middle score: The activity engages students in constructing a summary of the text.

Low score: The activity requires students to recall isolated and straightforward facts about a text only.

Mathematics:

High score: The lesson activity requires students to use complex, nonalgorithmic thinking to solve a problem or requires students to make connections between procedures and the underlying mathematical ideas (i.e., when students struggle with rigorous aspects of a task, teachers encourage them to work through it rather than giving students the answers).

Middle score: The activity requires students to apply a procedure without linking it to underlying mathematical concepts.

Low score: The activity requires students memorize or reproduce facts, rules, formulas, or definitions.

Rigor of Expectations for Student Learning

English language arts:

High score: The teacher expects students to focus on analyzing and interpreting the text and using text evidence to support a position (e.g., "An excellent book analysis will include at least one paragraph about why you think the main character acted as s/he did and will provide examples from the book.>").

Middle score: The teacher expects students to build a straightforward understanding of the text (e.g., summarize).

Low score: Expectations focus on low-level or nonacademic skills, such as producing neat work, or expectations not directly related to reading comprehension, such as adhering to writing conventions (e.g., "Each sentence must begin with a capital letter.>").

Mathematics:

High score: The teacher expects students to engage with the high-level demands of a task, such as identifying patterns or using multiple strategies to solve a problem (e.g., "Be sure to represent your findings in at least two ways, and talk about how those representations are similar and different.>").

Middle score: Expectations emphasize skills germane to student learning but are not complex thinking skills, such as expecting accuracy or correct application of procedures.

Low score: Expectations focus on low-level or nonacademic skills, such as memorizing facts or rules for cooperative learning.

Clarity and Detail of Expectations for Student Learning

High score: Expectations are communicated in explicit and detailed terms about what students need to include to produce quality work for the task (e.g., a list of elements of a well-written book review).

Middle score: The teacher provides a general expectation for what it means to produce quality work.

Low score: The teacher does not describe what students need to do to produce quality work.

Access to Expectations

High score: Expectations are publicly accessible and readily available to all

students (e.g., the criteria for high-quality student work are discussed in class and posted in the classroom or distributed to students).

Middle score: Expectations are discussed in class but students do not have access to a public record of the expectations.

Low score: Expectations are not provided to students (e.g., students are given procedural directions only, such as, "Complete questions 1 through 4 and don't forget to put your name on the paper before you turn in your answers.").

Student Interactions

Respect students show one another:

High score: Students are overtly positive toward one another by being friendly and helpful (e.g., students who are proficient in English assist English learners to understand instructions for a task).

Middle score: Students are not overtly positive or negative toward their peers (e.g., would not help or tease their classmates).

Low score: Students insult or tease each other, or make fun of each other's contributions and/or exhibit other negative behavior toward one another.

Students' participation in the discussion:

High score: Over 75% of the students participated in the whole-class discussion.

Middle score: Between 25% and 75% of students participated in the whole-class discussion.

Low score: Less than 25% of students participated in the whole-class discussion.

Students link to each other's contributions:

High score: Students consistently connect their ideas/positions to others' contributions and show how their ideas/positions relate to others' contributions (e.g., "I would like to add to what Maria was saying about how the story ended, but I think about it in a different way.").

Middle score: Students connect their ideas/positions to each other's but do not show how others' contributions relate to their own.

Low score: Students do not make any effort to link or revoice others' contributions.

Students provide accurate knowledge and rigorous thinking:

High score: Students consistently provide academically relevant evidence for their contributions or explain their reasoning (e.g., "I really think that this character was jealous because, look, it says right here . . .").

Middle score: Students provide evidence for their contributions or explain their reasoning, but these focus on superficial or trivial content.

Low score: Students do not make any effort to provide evidence or explain their reasoning.

Interrater agreement was assessed in nonsample classrooms ($N = 4$ teachers, 2 reading comprehension and 2 mathematics). Each possible rater pair observed two consecutive lessons. Overall agreement for the rubrics assessing instructional quality was 83.9% (87.5% for reading comprehension and 80.4% for mathematics) and 76.7% for the rubrics measuring quality of classroom climate. Overall agreement for measures of students' interactions was 84.5%.

Analyses

We calculated descriptive statistics and frequencies to describe the data. We used Pearson product moment correlations to explore associations between instructional quality, classroom climate, and student behavior. Beyond simple associations among variables, we also wanted to determine if certain teacher behaviors predicted student behavior. To this end, we applied multiple regression techniques to explain predictive relations between instructional quality, classroom climate, and student behavior. Given the exploratory nature of the study, we calculated correlations and conducted regression analyses between many of the classroom observation variables. To be conservative and account for experiment-wise alpha levels—the probability of making a Type 1 error—we considered only effects at the .01 level or less as significant. Field notes also were content analyzed for

TABLE 1. Descriptive Statistics for Classroom Climate Ratings, and Percentage of Observations Receiving Each Rating, by Variable (*N* = 64 Observations, 34 Teachers)

Variable	Mean	SD	Range ^a	Rating			
				1	2	3	4
Respect and regard teachers show to students	2.98	1.06	1–4	14.3	12.7	33.3	39.7
Opportunities for cooperative work	1.75	.69	1–3	39.1	46.9	14.1	...
Explicit classroom rules for respectful and prosocial behavior	2.33	.89	1–3	28.1	10.9	60.9	...
Students' respect for one another	2.56	.71	1–4	6.3	37.5	50	6.3

NOTE.—Possible range of responses was 0–3 for item 3 and 0–4 for other variables.
^aNo observer gave a score of zero for these variables in this set of observations.

themes relating to quality of instruction and affective climate of the classroom.

Results

Quality of the Classroom Learning Environment and Students' Interactions

In 73% of observations, teachers were respectful toward students and listened attentively to them during class discussions. However, this was not always the case. Results indicated that teachers were observed treating students in a disrespectful manner, including talking over students and yelling at, humiliating, or insulting them (including in a joking manner), in 14.3% of the observations. In 12.7% of the classes (rated a 2), teachers did not insult students but did not indicate interest in students' contributions during class discussions. Teachers in these classrooms either interrupted students or did not acknowledge or respond to their contributions (see Table 1).

In nearly half of the observations, students had some (albeit limited) opportunity to work together toward a common goal, usually by completing a group project. In over a third of the observations, students had no opportunity to engage in collaborative work. In these classes students worked alone. In over half of the observations (60.9%), explicit rules were posted against bullying, disrespectful, or hurtful behavior, and rules emphasized treating others with respect and kindness. Rules were not publicly displayed in 28.1% of the observations,

and in the remaining 10.9%, rules were displayed that did not emphasize specific prosocial behaviors such as treating others with respect and kindness. For example, rules emphasized speaking quietly, being on time, and so on.

Although teachers were generally fairly positive toward students, discussions during most observations were of poor quality (see Tables 2 and 3). Teachers frequently did not build on or extend students' contributions, and many teachers also did not press students to explain their reasoning and give evidence for their assertions. The expectations for learning that teachers communicated also did not focus on high-level demands in the majority of classrooms. For example, in two-thirds of the math observations, teachers' expectations did not emphasize complex thinking and/or exploring and understanding important mathematical concepts and relationships. In less than 10% of the reading comprehension observations, teachers held expectations that involved using high-level skills, such as interpreting a text, inferring major themes, analyzing character motives and relationships, or comparing themes and characters across texts.

Additionally, in 38.5% of the math observations students engaged with tasks that might lead them to explore and understand the nature of mathematical concepts, procedures, and/or relationships, such as using complex and nonalgorithmic thinking or applying a broad general procedure and

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TABLE 2. Descriptive Statistics for Quality of Instruction and Curriculum Ratings in Reading Comprehension, and Percentage of Observations Receiving Each Rating, by Variable (*N* = 38 Observations, 21 Teachers)

Variable	Mean	SD	Range	Rating				
				0	1	2	3	4
Teacher presses for evidence or for students to explain thinking	1.55	1.29	0–4	28.9	18.4	28.9	15.8	7.9
Teacher links student contributions to each other	1.58	1.33	0–4	28.9	18.4	28.9	13.2	10.5
Opportunity for students to apply high-level thinking in the discussion	1.41	1.26	0–4	37.8	5.4	40.5	10.8	5.4
Rigor of the curricula materials	2.28	.92	0–3	3.4	20.7	20.7	55.2	N/A ^a
Rigor of the lesson activity/task implementation	1.45	.91	0–3	15.2	36.4	36.4	12.1	0
Rigor of the expectations for student learning	1.35	1.11	0–4	19.4	45.2	25.8	0	9.7
Clarity and detail of expectations for student learning	1.88	1.16	0–4	6.3	40.6	25.0	15.6	12.5
Student access to expectations	2.03	1.64	0–4	18.8	34.4	9.4	0	37.5

^aThe rubric for rigor of the curricula materials in reading comprehension was the only one scored on a 4-point scale, from 0 to 3.

connecting it to underlying mathematical concepts. The implementation of mathematical tasks in 73% of observations also tended to be poor, and this was often true even when the task was higher quality (i.e., four of the nine rigorous mathematical tasks observed were implemented at a low level).

Although during most observations teachers had assigned high-quality texts for students to read, in only 12.1% of the observations were students engaged in rich discussions of these texts. In 43.2% of the observations, teachers’ questions only guided students to recall superficial information about what they had read. Additionally, only 12% of the lesson activities

we observed led students to engage with some underlying meanings or nuances of a text. Commensurate with other research on reading comprehension instruction (reviewed in Snow, 2002), we observed few opportunities for students to infer meaning beyond what was represented on the page, to link ideas in texts to larger ideas (or to other texts), or to develop analysis and interpretation skills.

In nearly half of the observations (40.6% reading comprehension and 42.3% mathematics), teachers provided students only with procedural directions for engaging in the lesson task. In other words, students were told what to do (e.g., “Write a paragraph in your journal answering the fol-

TABLE 3. Descriptive Statistics for Quality of Instruction and Curriculum Ratings in Mathematics, and Percentage of Observations Receiving Each Rating, by Variable (*N* = 26 Observations, 13 Teachers)

Variable	Mean	SD	Range	Rating				
				0	1	2	3	4
Teacher presses for evidence or for students to explain thinking	1.81	1.27	0–4	19.2	26.9	42.3	3.8	7.7
Teacher links student contributions to each other	1.54	1.10	0–4	19.2	23.1	23.1	26.9	7.7
Opportunity for students to apply high-level thinking in the discussion	2.28	.74	0–4	3.8	0	61.5	26.9	3.8
Rigor of the curricula materials	2.46	.91	0–4	3.3	0	57.7	23.1	15.4
Rigor of the lesson activity/task implementation	1.65	1.38	0–4	23.1	30.8	19.2	11.5	15.4
Rigor of the expectations for student learning	2.08	1.16	0–4	7.7	23.1	38.5	15.4	15.4
Clarity and detail of expectations for student learning	1.81	1.27	0–4	11.5	42.3	11.5	23.1	11.5
Student access to expectations	2.65	1.57	0–4	11.5	23.1	3.8	11.5	50.0

TABLE 4. Descriptive Statistics for Quality of Students' Interactions, and Percentage of Observations Receiving Each Rating, by Variable (*N* = 64 Observations, 608 Students)

Variable	Mean	SD	Range	Rating				
				0	1	2	3	4
Student respect for one another	2.56	.71	1–4	...	6.3	37.5	39.7	6.3
Student participation in class discussions	2.21	1.34	0–4	19.7	4.9	26.2	...	16.4
Students linking contributions to one another	1.09	1.04	0–4	25.0	56.3	10.9	...	7.8
Students providing evidence for their assertions	1.55	1.23	0–4	25.0	26.6	25.0	6.3	7.8

NOTE.—Possible range for all scales was 0–4.

lowing question"; "Complete problem 3 on page 27 with your group") but were not told what they would need to do, or include in their work, to be successful on the task.

Finally, students' behavior toward one another was generally positive in the majority (56.3%) of observations, and in about half the observations, 50% or more of the students participated in class discussions (see Table 4). The quality of participation was limited, however. Students in only 18.7% of the observed lessons made any effort to link their own contribution to their peers' in class discussions (i.e., the lesson was rated a 2 or higher for this dimension), and students provided at least some evidence for their assertions in only 23.4% of the classrooms.

Classroom Climate, Rigorous Instruction, and Student Interactions

We computed Pearson product moment correlations as a first step in examining the association of the quality of the classroom climate and rigorous instruction to students' interactions. The correlation coefficients are presented in Table 5. Results indicated that the respect teachers showed students was associated with the respect students exhibited toward one another ($r = .64, p < .001$) and with the extent of support students gave for their contributions in class discussions ($r = .43, p < .001$). Opportunity to engage in cooperative work in classrooms was related to the extent to which students

supported their contributions in class discussions ($r = .33, p < .01$). The posting in classrooms of rules for respectful, prosocial student behavior was associated with increased student participation in class discussions ($r = .43, p < .001$).

With regard to the relation between instructional rigor and students' interactions, the degree to which teachers pressed students to support their assertions in class discussions and linked students' contributions to one another, and the overall rigor of class discussions, were, not surprisingly, related to student participation ($r = .71, p < .001, r = .76, p < .001, r = .64, p < .001$), students linking their own to their peers' contributions ($r = .66, p < .001, r = .73, p < .001, r = .69, p < .001$), and students supporting their contributions with evidence ($r = .90, p < .001, r = .83, p < .001, r = .72, p < .001$). The rigor of curricular materials was associated (though less strongly) with these student interactions as well (student participation, $r = .36, p < .01$; student linking, $r = .37, p < .01$; and students giving evidence for their assertions, $r = .42, p < .001$). The rigor of lesson activity also was related to how effectively students supported their assertions with evidence in class discussions ($r = .42, p < .001$).

The quality of teachers' expectations for student learning was not associated with the rate and quality of students' participation in class discussions or with students' behavior toward their peers. This was not

TABLE 5. Bivariate Correlations between Classroom Climate, Quality of Instruction and Curriculum, and Student Interaction Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Teacher respect for students	1	.48**	.16	.33*	.38	.29	.39*	.20	.27	.17	.39*	.64**	.24	.28	.43**
2. Opportunity for cooperative work		1	.19	.24	.21	.16	.50**	.49**	.52**	.21	.43**	.26	.11	.23	.33**
3. Rules for respect/class behavior			1	.27	.26	.07	.15	.01	-.03	.08	.00	.13	.43**	.31	.19
4. Teacher presses for evidence				1	.86**	.71	.36*	.40*	.21	.02	.12	.15	.71**	.66**	.90**
5. Teacher links student contributions to each other					1	.67**	.34	.25	.08	.14	.09	.27	.76**	.73**	.83**
6. Rigor of discussion						1	.55**	.19	.18	-.08	.01	.14	.64**	.69**	.72**
7. Rigor of materials							1	.24	.44**	.06	.20	.14	.36*	.37*	.42**
8. Rigor of lesson activity								1	.50**	.19	.33	.16	.10	.19	.42**
9. Rigor of expectations									1	.47**	.64**	.10	-.02	.14	.25
10. Clarity of expectations										1	.75**	.11	-.05	.13	.08
11. Access to expectations											1	.27	-.09	.06	.22
12. Students respect for one another												1	.08	.23	.28
13. Student participation in class discussions													1	.70**	.72**
14. Students link contributions to others'														1	.72**
15. Students provide evidence of opinions															1

* $p \leq .01$.
** $p \leq .001$.

surprising, given that the expectations communicated to students during our observations were nearly always restricted to lesson activities (e.g., what students needed to include in their work to get a good grade). Only two teachers explicitly communicated expectations for student participation in class discussions.

The second step in our investigation was to use multiple linear regression analysis to develop a model for predicting students' behavior toward one another and the amount and quality of student participation in class discussion from measures of instructional quality and classroom climate. Specifically, the goal of these analyses was to investigate the relative contribution of the classroom climate and instructional quality to specific student interactions. Results of these analyses indicated that, holding all other variables constant, the degree of respect teachers showed students significantly predicted students' behavior toward one another ($B = .546$, $t_{11} = 3.316$, $p = .002$). Results indicated as well that the presence of explicit rules in the classroom for respectful, prosocial behavior significantly predicted the number of students who participated in discussions ($B = .330$, $t_{11} = 3.347$, $p = .002$). The quality of student participation was predicted by teachers pressing students to explain their thinking in discussions ($B = .558$, $t_{11} = 3.810$, $p = .001$).

A View of Two Classrooms

To gain another perspective on the statistical analyses, we returned to our field notes to examine the interplay of instructional rigor, creation of a positive learning environment, and students' behavior. In the following sections, we describe two contrasting sixth-grade reading comprehension lessons that illustrate the range of classroom practice we observed.

Ms. Smith. Our first example illustrates a low score for both classroom climate and quality of instruction. This class period began chaotically; students milled around

talking and laughing with each other well after the bell had rung. Ms. Smith spent this time returning graded homework to the students. She called the class to attention and began a short class discussion about character traits. The discussion (and following class activity) was conducted to prepare students to describe the main characters from the Jerry Spinelli book they were reading in class. The following is an excerpt of dialogue from the class discussion:

- 1 T: Character traits? Who remembers [what these are?]
- 2 S1: Something about a person, about their personality, something they like to do.
- 3 S2: Description of someone.
- 4 T: Does that sound good to you Joanne?
- 5 S3: Don't know about that second one [a description of someone].
- 6 T: [Gives hair color examples.]
- 7 T: Tina is a freak. Is that a description? [Teacher is referring to Tina, a student in the class.]
- 8 S4: No, but it's how she acts.
- 9 S5: Rosie is two-faced. That's a trait. [Points to Rosie, who is sitting across from S5.]
- 10 T: [Hands out the lesson activity—a list of adjectives for students to define—saying] First, you and your partners, see how smart you are... for some it'll be easy... for others... well... [chuckle]. Work together. Read the word, put a check mark by it if you know what it means, write the definition next to it.
- 11 T: [To one boy in the class sitting alone] Where's your partner? No one likes you anymore, is that it?
- 12 T: [Boy moves to sit next to girl in another group.] Are you two in love?

As shown in turn 7, the teacher opens the discussion of character traits by referring (in a joking manner) to one of the students in the class as a "freak." Although this comment was not necessarily intended

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to be hurtful, it is notable that students subsequently followed her example. For example, in turn 8 a student adds to the teacher's example, "Tina is a freak," by commenting, "No, but it's how she acts." A student builds on that comment in turn 9 by offering her own example of a character trait at another student's expense (i.e., that Rosie is "two-faced"). The teacher's initial statement putting down a student, therefore, appears to have led other students in the class to make hurtful remarks about their peers. The teacher did not reprimand the students in any way for their negative comments, and the teacher's behavior and what was posted on the walls indicated that no explicit rules or policies existed with regard to making unkind or inappropriate remarks about others.

It is notable as well that the class discussion did not focus on the text students were reading. For example, students did not talk about the qualities or traits of characters, nor did they deal substantively with the difference between a character trait and a physical description. Ms. Smith did not ask students academically challenging questions or ask them to provide elaborated responses to or explain their thinking. The discussion thus received a low score for its level of rigor.

The activity Ms. Smith used also received a low score. Students worked in small groups to define a list of adjectives (e.g., "bright," "honest," "prim," "ugly," "pretty," etc.), using a dictionary as needed. Students spent a large majority of the class period working on this activity while the teacher walked around the room joking with students, talking about baseball, and so on. For the final 10 minutes of the period, Ms. Smith reviewed with students the definition of each word.

Insinuating that this task would not be easy for students who were not "smart" (turn 10), the teacher set up a competitive dynamic that did not reward effort and could be seen as reinforcing an entity theory of intelligence (i.e., that intelligence is a

fixed trait that cannot be altered). This view has been shown to have deleterious consequences for adolescents (Blackwell, Trzesniewski, & Dweck, 2007). Ms. Smith added to the negative atmosphere of the classroom by teasing students about not being liked—a concern for many adolescents (turn 11), by asking if one student was "in love" with another student—also potentially embarrassing for a sixth grader (turn 12).

Furthermore, although developing vocabulary knowledge is important for furthering comprehension and writing skills, defining words out of context is a poor way to build students' capacity in this area (e.g., Beck, McKeown, & Kucan, 2002). In addition, the words students were asked to define were not rigorous for sixth grade. Words such as "pretty" and "honest" are commonly spoken, well understood, and part of most children's productive vocabulary by fourth grade (Dale & O'Rourke, 1981). Defining them in sixth grade does little to build students' vocabulary or command of academic language. Moreover, the task did not build on, or deepen, students' knowledge of the text they were reading or require any writing or elaborated response. As does the discussion, the quality of the learning activity also illustrates a low score for rigor.

Ms. Jones. Ms. Jones, in contrast, illustrates the highest scores for both quality of classroom climate and class discussion (she did not engage students in a lesson activity on the days we observed). On the first day we visited, the teacher began the discussion by reviewing with students her expectations for their participation in the discussion. She referred students to a chart posted in the front of the room and read aloud, "Look at the chart. Everyone participates; makes connections to characters, other books, or self; cites text to back up statements; brings others in; stays on topic; validates contributions of others; analyzes what the author is doing; is respectful; asks questions, looks for clarification; takes

turns; doesn't yell; uses conversation starters; [there are] no right or wrong answers."

These expectations (or class rules) are exemplary in that they focus both on the substance of students' comments (e.g., cites evidence to back up statements; makes connections to characters, other books, or self; analyzes what the author is doing; etc.) as well as on the manner in which students contribute and relate to their peers (e.g., brings others in, validates contributions of others, is respectful, takes turns, etc.). By letting students know the appropriate norms for participation, the teacher helped create a safe climate in which students could contribute, as illustrated by the fact that nearly every student in the class spoke at some point during the discussion. An excerpt from the class discussion is shown below (ellipses signify where text was missing or abbreviated in the field notes):

- 1 T: Discuss among yourselves why Mamacita is so unhappy.
- 2 S7: I think she's depressed because she dropped out of school and only knows a few words of English, and she went from a home in the country to the city.
- 3 T: Let me correct you there, in that she came from *another* country.
- 4 S8: I agree with him, and I think she's mad because her niece or son is speaking English and she doesn't.
- 5 S9: I respectfully disagree. I think she's *jealous* of the boy.
- 6 S10: I think she's homesick.
- 7 S11: I agree with Paul, Andy, and Kevin and respectfully disagree with Mike. On page 78, "...Pepsi..." She's disappointed and sad that he's learning English and not... [Spanish].
- 8 S12: I agree and also think that she doesn't want to forget home.
- 9 T: Yes, she thinks it's a betrayal that her son is learning English. She's resisting learning, like in *Sea Folks*, some didn't want to assimilate.

- 10 S14: What do you think? [to another student]
- 11 S15: Only eight words...
- 12 S16: I think this is a great example of how kids learn English easier.
- 13 T: Can you think of another story where kids learned faster?
- 14 S16: *Sea Folks*... Taiwan [uncle, son].
- 15 T: That's a good example of kids picking it up easier. Anyone's parents have a tough time?
- 16 S4: My mom was born in Japan.
- 17 S2: My parents have a tough time.
- 18 S8: My dad is still struggling, going to school. My mom can't speak English well.
- 19 S6: My parents learned English in Africa.
- 20 T: Who else learned English from TV?
- 21 S5: The kid from *Sea Folks*.

In this excerpt, Ms. Jones both builds on students' contributions and presses them to make connections between texts. For example, in turn 9 she agrees with and builds on a student's contribution and links the experience of the character to that of other characters the class had read about. Later, in turn 13 she presses a student to build on his statement (in turn 12) that "this is a great example of how kids learn English easier." In turn 15 she also prompts the students to connect the story to their own families' experiences and again relates the story they are reading to another text (in turn 20).

Students, in turn, built on and validated each other's contributions throughout the discussion. This is exemplified in turns 4 through 8. In turn 4 a student validates a peer's earlier comment and adds to it. This statement is challenged in turns 5 and 6 by students. These exchanges from multiple students were summarized by a student in turn 7 and added to in turn 8 by another student. What is exemplary here, and markedly different from Ms. Smith's classroom, is that throughout the conversation students listened attentively to one another

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and were able to agree and disagree with one another in a constructive, respectful manner. No one was criticized for his or her contributions.

Additionally, Ms. Jones asked probing questions and guided students to provide evidence for their contributions. This was evident in the students' responses, as illustrated in the following excerpt. (Note that the observer was unable to record exactly which students contributed during this part of the discussion.)

- 22 T: Is he an uncaring husband or is he frustrated and doing his best?
- 23 S: I think he is frustrated [reading from text] . . . "man paints the walls pink."
- 24 S: I don't think.
- 25 S: I'd like to hear what she has to say.
- 26 S: The husband is frustrated.
- 27 T: To build upon that, the husband is doing his best, like Tracy said. I moved here from [another country] and learned that I could adapt to my new country and still love the old country. That's what the husband has done . . . the wife thinks it's a betrayal to her home country to make friends here. She just wants to go home. That's why she's saying on page 78, "When, when, when?" I learned things about Esperanza. What can we learn about her from this?
- 28 S: I thought it was his mom, not his wife.
- 29 S: I disagree with you, because Esperanza would know that it's his wife.
- 30 T: I think Paul is right. Heidi?
- 31 S: Where it says [reading from text] . . .
- 32 T: But what can we tell about *Esperanza*?
- 33 S: That she's very observant.
- 34 S: I agree with Paul and Anna and would like to see if Patrick does also?
- 35 S: Yes, shows that she understands.
- 36 T: Esperanza is nonjudgmental and shows understanding.

In turn 22 Ms. Jones asks a student to consider if the husband in the story is "uncaring" or "frustrated and doing his best"—a challenging question that encourages students to infer the character's motivations (or "read between the lines") during events described in the story. Later in the exchange (turn 27), the teacher prompts students to think about what the events in the story reveal about the main character (Esperanza)—another question that guides students to consider the subtle nuances of the story (versus recalling superficial information). And in turn 32, she presses a student to focus her response on the main character. Students responded to these questions by referring to text evidence to support their responses (turns 31 and 36).

We chose these examples to illustrate contrasting classrooms. Most observations fell between these two. We further examined our data for anomalies that ran counter to this trend but did not find a classroom that had a poor climate and high academic rigor. We did, however, identify one classroom observation with high climate scores and low scores for academic rigor. In this sixth-grade English language arts classroom, the teacher was warm and respectful toward students and had classroom rules posted that emphasized treating others with respect and kindness. The content of the lesson, however, focused on students making predictions about a book based only on the illustration on the cover. Consequently, the lesson received a low score for academic rigor overall, though many students participated in the conversation.

Discussion

Our results add support to research indicating that quality of classroom climate and rigor of learning activities reinforce each other and contribute to students' learning experiences. Although our design did not allow us to investigate the direction of effect between teachers and students beyond simple regression models (and this should

be explored further in future research), our results add to research suggesting that teachers are powerful models for students (e.g., Gillies & Boyle, 2006; Stewart, 2006). Students imitate the discourse they hear in classrooms, and teachers serve as exemplars of behavior. We found that more respectful behavior on the part of teachers was associated with more positive interactions among students, whereas disrespectful teacher behavior appeared to be instrumental in promoting student negativism, as illustrated in Ms. Smith's classroom. This was true even when teachers delivered insults in a joking manner. Regardless of intent, insults and humiliating teacher comments appeared to have a deleterious influence on students' behavior.

We did not systematically track individual students; however, in at least two schools our observation of students across multiple classrooms on the same day suggested that students changed in their behavior toward other students and in their engagement in academic activities (e.g., class discussions) depending on which teacher's classroom they were in. For example, the second author observed a seventh-grade mathematics class and an English language arts class the next period and noticed that a group of four boys who had been unruly and disruptive in the first class were well-behaved and active participants in the second. The first author noticed this same type of behavior in another school where two sixth-grade girls were engaged participants in a class observed earlier in the day and were disruptive (i.e., speaking out of turn, loudly joking with friends) in a class observed later that same day. The directionality of the relation between teacher and student behavior would need to be studied systematically with larger samples of classrooms over time, however, to draw definitive conclusions.

Clear and explicit rules for prosocial, respectful behavior were an important factor in fostering student participation in class discussions, though, as we described

earlier, we saw such rules articulated in only about half the classes observed. Students participated in greater numbers in class discussions when rules for positive, prosocial behavior between peers were in place (and enforced). The *quality* of student participation, however, was predicted only by the extent to which teachers urged students to explain and support their contributions and by the rigor of the questions they asked students. This was illustrated in Ms. Jones's classroom where, in addition to expressing clear expectations for respectful behavior and modeling such behavior, she prompted students to support and explain their answers. However, the academic rigor of the reading comprehension and mathematics lessons in our sample was low overall. Commensurate with other research studies, our results indicate that the quality of academic work in middle schools does not keep pace with the increasingly sophisticated reasoning abilities and cognitive processing that one would expect from adolescents (Juvonen et al., 2004; Midgley & Edelin, 1998; Snow, 2002).

In conclusion, these results support the idea that both the affective and academic dimensions of instructional practice reinforce each other and contribute to optimal student success. Efforts to improve learning environments, such as preservice training and in-service professional development for teachers, ideally would include a focus on increasing the academic demand of class activities and on emphasizing the social processes and routines that support academic rigor, including the creation of positive and emotionally safe environments for students.

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